

What Is claimed is:**1. A shared storage network system,**

- comprising

- 5 ○ a plurality of storage servers, each providing a storage portion of the shared storage network system, each storage portion being divided into a plurality of sectors, each sector being divided into a plurality of blocks, a virtual block identifier being associated to each of the blocks such that the entirety of all of the virtual block identifiers of the blocks form a global block address space in which each of the virtual block identifiers is unique;
- 10 ○ at least one storage client;

- wherein

- 15 ○ the plurality of storage servers and the at least one storage client are grouped into a plurality of local area networks interconnected to form a global network;
- the at least one storage client is adapted to have read and/or write access to at least one block of at least one of the storage portions associated to one of the local area networks which differs from the local area network of the storage client;
- 20 ○ the plurality of local area networks are interconnected such that in case of a read or a write access of one of the at least one storage client to at least one of the blocks, the virtual block address of a block to which access is desired is translated into a physical block address to identify the physical block associated with the virtual block.

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**2. The shared storage network system according to claim 1,
wherein the global network is an optical network.****3. The shared storage network system according to claim 1 or 2,**

- 30 wherein at least one of the local area networks comprises a linking computer being interconnected as a link between the at least one storage server and/or the at least one

storage client of the local area network associated with the linking computer on the one hand and the remaining local area networks on the other hand.

4. The shared storage network system according to claim 3,

5 wherein the linking computer is adapted to perform the translation of a virtual block address of a block to which access is desired into the physical block address of this block.

5. The shared storage network system according to any of claims 1 to 4,
wherein at least one of the local area networks is

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- an optical network or
 - a wired network.

6. The shared storage network system according to any of claims 1 to 5,
which is adapted to operate based on the Storage Networking Industry Association
15 standard.

7. The shared storage network system according to any of claims 3 to 6,
wherein a unique computer identifier is associated to each storage server and/or to each
storage client and/or to each linking computer of each of the local area networks.
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8. The shared storage network system according to claim 7,
wherein the unique computer identifier is determined as a hash.

9. The shared storage network system according to claim 7 or 8,
25 wherein the unique computer identifier is determined as a cryptographic hash.

10. The shared storage network system according to claim 8 or 9,
wherein the hash is based on the internet protocol address of the computer and on a private
key.
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11. The shared storage network system according to any of claims 1 to 10,
which is adapted such that a temporally varying attachment and detachment of storage
servers and/or storage clients to the shared storage network system is enabled.
- 5 12. The shared storage network system according to any of claims 1 to 11,
which is adapted such that routing, in case of a read or a write access communication
between a storage client and a storage server, is implemented by a fully adaptive routing
scheme adapted to find a global network-wide least-cost path.
- 10 13. The shared storage network system according to claim 12,
wherein the global network-wide least-cost path is determined based on a dynamic link
state and/or a custom-designed cost function.
14. The shared storage network system according to any of claims 1 to 11,
15 which is adapted such that routing, in case of a read or a write access communication
between a storage client and a storage server, is implemented by a partially adaptive
routing scheme, according to which a plurality of alternate paths between a pair of a
storage client and a storage server are stored in a routing table at the storage client and/or
the storage server.
- 20 15. The shared storage network system according to any of claims 1 to 11,
which is adapted such that routing, in case of a read or a write access communication
between a storage client and a storage server, is implemented by a static adaptive routing
scheme, according to which one or more fixed alternate paths between a pair constituted by
25 a storage client and a storage server are stored at the storage client and/or the storage
server.
16. The shared storage network system according to any of claims 1 to 15,
which is adapted such that, in case of a predetermined global network path for a read or a
30 write access communication between a storage client and a storage server, one or more
other storage clients and/or storage servers along said path are implemented as cache
storage nodes for temporarily storing data transmitted according to the read or write access.

17. The shared storage network system according to any of claims 1 to 16,
which is adapted such that the physical block address of each block comprises

- a non-deterministic physical block address to address the unique physical block mapping to a particular virtual block associated with a particular virtual block address;
- a deterministic physical block address to address a unique physical block in the global network to determine the location of the associated physical block.

18. The shared storage network system according to any of claims 1 to 17,
which is adapted to implement a storage data transmission scheme comprising an optical burst mode flow control and an optical stop-over burst transmission method.

19. A method for operating a shared storage network system,

- the shared storage network system comprising
 - a plurality of storage servers, each providing a storage portion of the shared storage network system, each storage portion being divided into a plurality of sectors, each sector being divided into a plurality of blocks, a virtual block identifier being associated to each of the blocks such that the entirety of all of the virtual block identifiers of the blocks form a global block address space in which each of the virtual block identifiers is unique;
 - at least one storage client;
 - a plurality of local area networks, wherein the plurality of storage servers and the at least one storage client are grouped into the plurality of local area networks interconnected to form a global network;
- the method comprising the steps of:
 - adapting the at least one storage client to have read and/or write access to at least one block of at least one of the storage portions associated to one of the local area networks which differs from the local area network of the storage client;

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- interconnecting the plurality of local area networks such that in case of a read or a write access of one of the at least one storage client to at least one of the blocks, the virtual block address of a block to which access is desired is translated into a physical block address to identify the physical block associated with the virtual block.

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